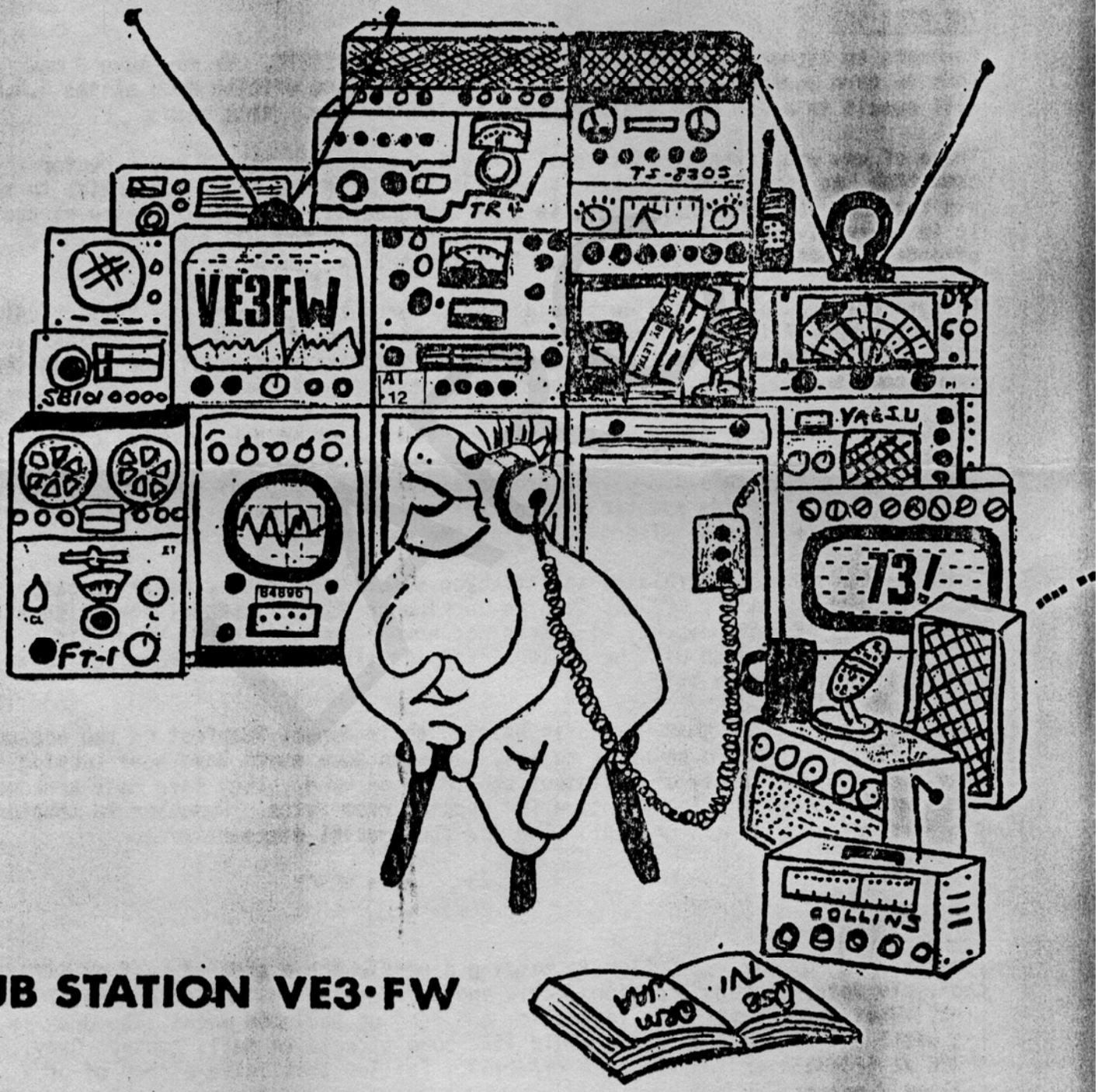
May 85

HI-Q

LAKEHEAD AMATEUR RADIO CLUB
BULLETIN



CLUB STATION VE3·FW

Founded 1934 *Incorporated* 1979

THE NEXT MEETING OF THE L.A.R.C. WILL BE HELD THURSDAY, MAY 9TH, 1985 AT THE

E.M.O. BUILDING, CORNER OF WATERLOO/VICTORIA AVE.

COFFEE (JAVA, MUD, JOE ETC.) POP AND DONUTS WILL BE SERVED.

THE PREZ SEZ

Congrats to Richard, VE3OPI, Axel, VE3OPF and John VE3OTC. We now have 3 new hams in town burning up the bands. Hopefully the June writing down at the D.O.C. will result in a few more amateurs here in Thunder Bay. Nice going!

Those of you who attended last month's meeting are aware that a new repeater committee has been formed. Skip, VE3BBS is the Chairman, and I don't wish to steal his thunder. In a nutshell, here is what's happening. VE3YQT will stay as such. It is currently operating with a temporary antenna at the 100 foot mark while efforts are made to remove the water from the heliax.

This is only temporary, and we should have a verdict by June on the heliax. Also autopatch on YQT is now operational. Use #1 to access it, and # to terminate. Although the controller does not require you to identify yourself when using the autopatch, the DOC does. Please remember to do so.

Although there are no speed dial provisions at present, a new repeater controller is on the shopping list. If our raffle goes well, we can look forward to seeing the new controller this summer. A presentation for funding is also being worked on which should provide additional improvements to the repeater. I expect Skip will have a few words of wisdom to say at the next meeting.

While on the subject, Geraldton and Atikokan should both have 2 meter repeaters on the air this summer. VE3JAU Glen is working on VE3GLD in Geraldton which will be on 147.90/30. At present, Glen does not have a duplex. Carl, VE3JTV is working on VE3NWA which will be on 146.10/70 in Atikokan. A few receiver bugs are still being worked out.

Also, please remember that Duluth is holding their annual Swapfest on the weekend of May 11/12. From the sound of things, the boys down south have been keeping busy, and a wide variety of equipment should be on hand. They have made arrangements with the Holiday Inn downtown for special room rates. Remember to mention the Arrowhead Radio Amateur Radio Club for the special discount rate.

73 Tom VE3CX

RAFFLE TICKETS

The Lakehead Amateur Radio Club is holding a raffle for a side of beef or $600 cash. To date, tickets are giong well, and we are closing in fast on the $400 mark. What can I say? It's fantastic, and keep up the good work! The draw is not until June 30th, and if you would like some tickets to sell, contact Gary, VE3CK at 623-8132 or Tom VE3CX at 767-1453. Failing that, give either of us a call on 2 meters.

LARC 1984/85 EXECUTIVE

President	Tom	VE3CX	767-1453
Vice President	Vic	VE3ECV	577-3429
Secretary/Treasurer	Bill	VE3EFC	767-9242
Director	Gary	VE3CK	623-8132
Director	Ralph	VE3MZX	683-8753
Director	John	VE3GOW	623-2024
Director	Dan	VE3KRO	683-8100
HI-Q	Gary	VE3CK	623-8132
	Gary	VE3NNR	767-2284
Emergency Coordinator	Skip	VE3BBS	767-2307
Station Manager	Bob	VE3NHN	345-2613
Repeater Committee Chairman	Skip	VE3BBS	767-2307
	Tom	VE3CX	767-1453
	Gary	VE3CK	623-8132
	Ed	VE3KRP	623-7651
	Bill	VE3EFC	767-9242
	Laurie	VE3BCD	622-1628
	Bill	VE3XJ	344-1866

Bob VE3CMA

We are saddened to hear of the loss of Bob VE3CMA from Geraldton in early April. Bob came to Geraldton in 1972 and was actively involved with local HAM activities. Always helpful, Bob received his amateur ticket in 1964, and his advanced in 1967. He was president on the NORTOWN AMATEUR RADIO CLUB IN TORONTO IN 1968-9; taught code & theory there, and helped write a chapter in the HAM HANDBOOK FOR BEGINNERS. He is survived by his wife Sue VE3FTS, son Andy and daughter Sheri. Andy hopes to go on and obtain his TICKET. He will be missed by all who knew him.

Submitted by Ken, VE3KRX - Geraldton

HAM RADIO CLASSES

At the time that this is being written, we now have two new hams here in Thunder. VE3OPF is Axel Rheufus. John Irskine also passed and is VE3OTC.

Most of the people taking the course wrote the exam with varying degrees of success. There will probably be a good turnout in June also. Hopefully there will be several more new callsigns in the near future.

At the end of the course, we asked for some feedback as to how our instructors did. Here are some of the comments received:

- good class, good teachers, good deal for the money
- overall very good, help much appreciated
- congrats on a job well done
- well taught... etc.

DIRTY LAUNDRY

Ken VE3EFZ was the first one to time out the new YQT. Careful Ken, there is a piece of hardware looking for a home! VE3JAA tried to play a 45 on his disk drive--what's that funny noise? VE3AVS jogged his way onto the saltmine net. VE3KRP is really James Bond in disguise--he fooled you, eh? VE3ARN has returned from the land of sunshine and air conditioning--welcome back Bill. VE3CK is practicing for the old wild west show. VE3OPF holds the early riser record for checking into the salt mine net before Arnold. VE3BCD has an empty space in his garage. VE3CK sometimes thinks he is VE3CX and vice-versa. VE3JAR has advised us that "the penthouse suite is ready". The welcoming committee is poised for action--Duluth here we come! VE3JAA was the first to introduce the Labatt's model 24 to the VHF market. NHN was last seen playing janitor in a drum and getting headaches. VE3JAU has bound a new love VE3GLD. VE3BCD has put everything on sale.

CONSTITUTION AMENDMENT PROPOSED

At the April general meeting, a change to our Constitution was tabled. The article to be changed is article 3, Amendment B. It currently reads as follows "the President or Vice-President may call a meeting at any time, providing the membership is duly notified". We would like to amend it to the following--"the President or Vice-President may call a meeting at any time, providing each member is notified by mail".

Once this has been voted on, we would like to have new copies of the Constitution typed up, and ensure each member receives a copy.

Field Day

Every year in June, there is a special weekend reserved for field day. It is held on the fourth weekend and this year, it falls on June 22 and 23. This is a weekend where we pack up the rig and family and "head for the hills". For a weekend of operating and fun.

We need a volunteer or volunteers to get things coordinated. A return to Kakabeka Falls Park has been suggested. It should not take too much effort to get things lined up, and it would be a shame if we don't have a field day. Bring your ideas to the May meeting. Over the past year, the Club's coffee fund (money collected from meetings & classes) has grown to a tidy sum. We had hoped it could be used towards field day (free hot dogs, pop, ice cream (rum flavoured) do nuts, etc.) What are <u>your</u> feelings toward this?

* * *

Arnold JAA tells us that the Swap Shop is held at 7 pm Friday, and 12:45 Sunday. Arnold tells us he is the warranty centre for any equipment sold.

INTRODUCTION TO PACKET RADIO

Radio amateurs in Canada, Sweden, Japan, and the United States have been experimenting with packet radio, a system of computer-based communications. This new mode can provide high-speed communication with efficient use of the spectrum, and is resistant to interference due to other stations and to signal degradation due to adverse band conditions. Not only can packet radio be used for informal amateur QSOs and traffic handling, but it has additional possibilities for exchange of data between hams with computers, "bulletin boards" and message systems, and remote computer programming.

WHAT IS PACKET RADIO?

Packet radio is a communication system in which information is digitally encoded. In this respect it is similar to RTTY or ASCII, but with important differences. These differences are the key to insuring error-free reception and at the same time allowing maximum use of the spectrum through shared frequency use.

Data integrity is provided by packet radio through a "handshaking" technique and error detection. Along with each transmission, a computed value called a "frame check sequence" (FCS) is sent, which allows the receiving station to check for errors. The receiving station acknowledges an error-free packet with a special acknowledgment (ACK) signal. If the sending station does not receive such a signal within a certain period of time, it automatically retransmits the packet.

A packet also contains identification of the destination station, permitting several QSOs to take place on the same frequency. A packet radio station can automatically ignore any packets which are not addressed to it. Due to the fact that the duration of most packet transmissions is very short, a user does not need the channel most of the time. The time between transmissions is available to other users on frequency. This system is called time-domain multiplexing. On a very busy channel, the user will notice an increased delay time before getting replies to transmissions, but the packet radio equipment will take care of automatic retransmissions and sorting out the replies meant for the station. The user never "hears" the QRM.

WHAT IS A PACKET RADIO STATION?

Packet radio requires the use of a microprocessor-based controller at each station, and it will obviously appeal to the ham who already has a computer in his shack. However, it does not require that the operator be a programmer, or even that the station have a personal computer. All that is really necessary

is a terminal, a terminal node controller (TNC), and an amateur radio transceiver.

The terminal can be a simple display or typewriter terminal that produces ASCII characters, a personal computer, or even a commercial mainframe computer. What you need is a terminal with a keyboard to allow you to talk and a screen or printer to allow you to read incoming information. You can even get an get an inexpensive terminal that uses a TV set for the display.

The way in which most terminals encode ASCII characters is in an "asynchronous" format. Since characters are encoded as they are typed, there is a flag consisting of one or more "mark" (binary 1) values to mark the beginning and end of each character. The device decoding the characters expects a specific "baud rate", or number of transitions from "mark" to "space" (binary 0) per second during the character, but no particular time interval between characters themselves.

The terminal node controller is the heart of the packet radio system. It has one port that is connected to the terminal or computer, and communicates through it by asynchronous ASCII format at the baud rate required by the terminal. The TNC converts the data stream from the terminal to a packet by attaching a "header" showing the destination of the packet and control information for the network, a "tail" containing the result of the FCS calculation for error detection, and flags to mark the beginning and end of the packet.

The second port of the TNC connects it to the transceiver microphone and speaker audio lines, and the PTT line. Ordinarily, the TNC will produce AFSK modulation by putting one of two tones into the microphone input, corresponding to a "mark" or "space". In this fashion, the packet is sent out on the air at the packet channel baud rate, which is unrelated to the terminal baud rate at the other port of the TNC.

The receiving TNC reverses this procedure, decoding the audio tones from the speaker audio line of the radio, removing and reading the header and tail information, and passing a successfully received packet to the terminal at the terminal baud rate.

The part of the TNC that does the translation between the sequence of tone levels and the characters is called a "modem", short for MOdulator-DEModulator. This device may or may not be built into the TNC board. Most packet radio modems operate at 1200 baud, which corresponds to about 1200 wpm, although the FCC now authorizes much higher baud rates on some amateur bands. The audio tones used are 1200 Hz and 2200 Hz. This choice of frequencies is that of the Bell 202 modem.

The final component of a packet radio station is an amateur radio transceiver. Most packet radio activity so far has been

in the 2 m. band. The only important requirement of the radio is that its audio frequency response at 2200 Hz be adequate. In other words, the 2 m. FM rig you already have is probably just fine.

WHAT THE TNC DOES

The TNC consists of a special purpose microcomputer, containing all the necessary software and hardware to communicate with your terminal, assemble a packet, operate your transmitter and receiver to send and receive a packet, and decode a packet. The special functions of the TNC which would be difficult to implement with an ordinary personal computer are the use of protocol to communicate with other TNCs and real-time control.

The encoding and decoding of packets involves a carefully standardized set of procedures called "protocol". The protocol basically determines the exact form of the header and tail parts of the packet. The header allows receiving TNCs to automatically determine the purpose of the packet, e.g., net check-in, part of a QSO, or ACK to a previous transmission. The tail contains the FCS, which allows the TNC to automatically determine whether the packet was received correctly, and if so, to automatically acknowledge it. Since the protocol is programmed into the TNC, the operator does not need to know exactly what his packet "looks" like. In particular, he does not need to know how the destination of his packet is indicated. The operator communicates with other amateurs by call sign, and the TNC translates the call sign into the identification required by the protocol.

The TNC is required to perform a number of tasks simultaneously, including responding to events such as the receipt of a packet or instructions from the operator in "real time", in other words, as they happen. This makes programming in BASIC, the common language of personal computers, undesirable. This is because BASIC uses an "interpreter" which reads each line of the program and translates it into machine-type instructions every time the line is executed. The time required for the translation would prevent a program from responding rapidly enough in a packet radio environment. In order to meet the speed requirement, an assembly-language program or equivalent is required. While BASIC looks pretty much the same on any computer, assembly language is different for every machine. If the TNC were replaced by personal computers, program development would have to be redone for each variety of computer. In addition to maintaining the right pace, the TNC also must be constantly "listening" at both ports simultaneously while putting packets together or taking them apart. The hardware of personal computers may not even be capable of this sort of multi-task application.

Programming of individual TNCs must be as easy as possible, since there will inevitably be unforseen problems in the initial software. In addition, hardware changes may necessitate software changes. For this reason, TNCs are designed around

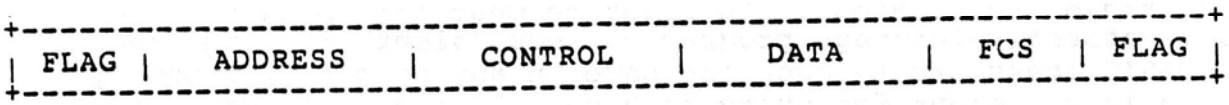
eraseable programmable read-only memories (EPROMs), which normally function like the ROM of a personal computer, where the vital software is stored in an indestructible form. However, if the need arises, they can be reprogrammed by "burning in" the new program using special equipment.

WHAT A IS A PACKET?

A packet is the basic message unit in packet radio. It ordinarily consists of a text message typed in by the operator, sandwiched between the header and tail information required by the protocol. In a typical QSO, a packet would be encoded and sent out by the TNC when the operator ends a line of typing by hitting the RETURN or ENTER key. In any event, the length of a packet is limited, usually to 128 characters. This helps to prevent a single user from "hogging" the channel, as well as making sure that the sending and receiving TNCs don't get swamped with information.

A packet need not consist of ASCII or Baudot character strings, however. It could contain information in other coding systems, such as BCD or EBCDIC, or even binary data such as a compiled computer program. The TNC, which uses a "bit oriented protocol" based on a standard called High Level Data Link Control (HDLC), can encode any of these equally easily. An advantage to this choice of protocol is that the functions it requires are available on a single large-scale integration (LSI) chip, which simplifies the TNC hardware and software. A second advantage of HDLC protocol is that the beginning and end of the entire message are flagged, making the "start" and "stop" bits for each character unnecessary when the packet is transmitted in "synchronous" format.

The "frame" of an HDLC is represented below. Each field of the packet is encoded as a sequence of 1s and 0s (bits) to be transmitted as "mark" and "space" tones. With the exception of the DATA field, all these fields are generated by the TNC as it assembles the packet for transmission. The operator is concerned only with the contents of the DATA field.



The FLAG is a unique bit sequence which identifies the beginning of a packet to the HDLC controller. This pattern corresponds to no sequence which would be encountered in any of the other fields, except possible in the transmission of binary data. Even in this case, there are provisions for distinguishing data from the flag sequence.

The ADDRESS field contains routing information for the packet. This information may include the destination station, the originating station, and possibly intermediate routing

information if the packet will be relayed to the destination. The destination and originating stations might be identified by a network address number or by amateur call sign, depending on the exact form of protocol being used.

The CONTROL field describes the purpose of the packet to the recipient. It identifies packets with such functions as initialization or termination of communications, packet acknowledgment, or request for retransmission. It may also contain a sequence number for a multi-packet message which must be received in the correct order.

The DATA field contains the message being sent, which will ordinarily be the text typed in by the user, converted into an ASCII data string. In the case of a packet identified in the control field as performing a control function, the DATA field may be absent.

The FCS allows the receiving station to verify that the packet has been received correctly. If the FCS calculated by the receiving TNC matches the FCS of the packet, an acknowledgment is sent; otherwise the packet is ignored.

The final FLAG marks the end of the packet.

WHAT IS A PACKET NETWORK?

A local area packet radio network (LAN) consists of a number of individual packet stations, which are ordinarily within simplex range. The net may also contain a digital repeater or "digipeater", which may also function as an individual station. The digipeater is a single-frequency relay which retransmits any correctly received packets.

The protocols currently implemented by amateur packet radio call for stations to communicate pairwise, through "connections" which are set up through exchange of special packets. An operator desiring to start a QSO with another net station will subsequently have his transmissions addressed to that station. In order to simulate a conventional amateur "net", stations can monitor transmissions of stations other than the ones to which they are connected. Of course, the TNC will only acknowledge those transmissions intended for that station.

As more packet radio LANs become active, there will be the possibility of link stations with access to two distinct areas. These stations can serve as communications links through which packets originating in one area can be funneled to an addressee in the other.

A more sophisticated possibility is that of a "gateway" station, which will be a specialized station having access to some long-distance mode of communications. The gateway station will reformat packets with another layer of protocol containing

inter-network linking information and transmit it to another gateway station in a distant LAN. Three possibilities are being explored for long-distance links.

Ground Relays

TERRACON will be a high-speed ground-based linking system utilizing UHF and/or microwave relays. It could potentially handle most long-distance packet radio communications in the United States and Canada. It will probably be a few years before TERRACON is implemented as a useful system, and somewhat longer before the continent is linked.

Satellite Service

AMICON will be a satellite-based network utilizing one of the special-services channels on the AMSAT Phase III-B satellite, using a reserved 5 kHz segment of the mode-B transponder (up on 435 MHz, down on 145 MHz). AMICON will allow intercontinental linking and contact with isolated areas not accessible to TERRACON. High data rate experiments are being planned for the 23 cm uplink/70 cm downlink (mode L) translator.

PACSAT is a new class of satellite designed solely for digital communications. Current designs call for multiple packet radio uplinks on 435 MHz into a low earth orbiting (LEO) UoSAT-class OSCAR satellite containing a packet radio repeater (digipeater). A common downlink on 145 MHz would provide either real-time repeating service, or a delayed message storage facility, using up to one megabyte of on-board storage. This "flying packet radio mailbox" could also have more traditional digital channels, like RTTY and ASCII.

There are also possible plans for a packet radio digital repeater aboard the AMSAT Phase III-C satellite.

Short-wave Links

SKIPCON is AMRAD's projected HF network of LAN gateway stations. The nature of HF propagation will require slower data rates (75 to 600 baud) and error correction as well as error detection protocol. A form of error-correcting code for amateur radio known as AMTOR may be the best candidate for handling the vagaries of HF channels. SKIPCON experiments have been conducted since the end of 1981.

HOW TO GET IN ON PACKET RADIO

There are currently two TNC designs available. The first packet radio TNC was designed by the Vancouver Amateur Digital Communications Group (VADCG). The Vancouver TNC is available as a bare board, and requires a power supply, external modem, and parts. It comes with instructions and notes on the power supply. A modem kit is also available from VADCG. The TNC design

is based on the Intel 8085 CPU and 8273 HDLC controller and includes 4K bytes of 2114 RAM and 4K bytes of 2708 EPROM.

The Tucson Amateur Packet Radio (TAPR) is currently testing a second TNC design. This TNC has the modem, radio interface, serial and parallel terminal interfaces, and power supply circuitry (exclusive of the transformer) on a single board. It is based on the 6809 microprocessor, and holds a total of 24K bytes of ROM and 6K bytes of RAM on the board. The 1933 HDLC chip it uses is compatible with the 8273 chip used on the VADCG board, and the TAPR TNC will be capable of VADCG compatible protocol. A parts kit and/or bare boards will be availble after completion of testing.

** This article was obtained from TAPR and submitted to HI-Q by Robert Gordon VE3 OPZ .

ADDITIONAL INFORMATION ON PACKET RADIO

In Canada, packet radio can be used by an amateur holding any class of license. This mode can be used on any of the bands that you would normally operate RTTY, although packet radio is more suited to VHF and UHF where the wider bandwidths can accomodate higher data rates. Presently, the majority of activity has been on 2m. Also the DOC has reserved a set of frequencies as outlined in schedule III of TRC-25 which are allocated for packet radio and allow much wider bandwidths, thus very high data rates can be achieved.

Equipment for packet radio can be obtained from several sources. Some of these are:

TAPR	-complete kit of parts and manual	$240 US
	-cabinet kit	$ 70 US
GLB Electronics	- PK1 TNC, complete assembled board	$149.95US
	-cabinet	$ 34.95US
AEA	-PKT-1 complete assembled unit, approx $590 US	
	- (this is a TAPR clone)	
Heathkit	- HD-4040, complete kit	approx $299 US
	- (another TAPR clone)	

There are several additional sources of information about packet radio. The following is a short list of these.

1. Packet Status Register (PSR)

   -newsletter from TAPR. Describes the current activities in packet radio and is issued every few months. Availble from TAPR for $16 per year which includes a membership to TAPR. Address: Tucson Amateur Packet Radio
   P.O. Box 22888
   TUCSON, AZ 85734-28

2. Gateway

   -biweekly newsletter from ARRL. Contains more up to date information than PSR (since issued every 2 weeks).

3. "Join The Packet Radio Revolution"

   -2 part article in 73 Magazine, Sept.,Oct. 1983. Contains a description of packet radio in general, and a thorough description of the TAPR TNC, including schematics and operating procedures.

4. For those who have a microcomputer and membership on the Compuserve network, Hamnet SIG (page HOM-11) stores information online about packet radio and current activities although most of it discusses the US activities.

** submitted by Robert Gordon VE3 OPZ

Murphy's 1st Law: The general law on why things go wrong 'If anything can go wrong, it will.

Murphy's 2nd Law: If it can be assembled wrong, it will.

Murphy's 3rd Law: If it can be operated wrong, it will.

Murphy's 4th Law: All failures will occur at the most inaccessible location.

Murphy's 5th Law: Everything costs more than the estimate.

Murphy's 6th Law: Every task takes longer than you think it will.

Murphy's 7th Law: Nothing is aseasy as it looks.

Murphy's 8th Law: If you tinker with or try to improve something long enough, eventually it will break.

O'Toole's Law: Murphy was an optimist.

Dude's Law of Duality (A special case of Murphy's 1st Law); Of two possible events, only the undesired one will occur.

Gumperson's Law (Incorporates the concept of desirability into a general law): The probability of a given event occurring is inversely proportional to its desirability.

Dr. Fyordor Flap - Flap's law of the Perversity of Inanimate Objects: Any inanimate object, regardless of its position or configuration, may be expected to perform at any time in a totally unexpected manner for reasons that are either entirely obscure or else completely mysterious.

Mule's Law: The Universal Field Theory of Perversity: The probability of an event's occurring varies directly with the perversity of the inanimate object involved and inversely with the product of its desirability and the efford expended to produce it.

The Theorum of the Dynamic Application of Law of Adversity and Perversity: Some events are more likely to occur in Los Angeles or New York rather than Miami or Chicago.

Parkinson's Law: Work expands to fill the time available for its completion.

McGurk's Law: Any improbable event that would create maximum confusion if it did occur, will occur.

Weiler's Law: Nothing is impossible for the man who doesn't have to do it himself.

(Credit: Kitchener Waterlo

THE GUELPH AMATEUR RADIO CLUB **VE3ZM** PRESENTS

THE 11th ANNUAL
CENTRAL ONTARIO
AMATEUR RADIO FLEAMARKET
AND COMPUTERFEST

SATURDAY, JUNE 1st, 1985

8:00 A.M. to 4:00 P.M.

DOORS OPEN TO VENDORS **ONLY** FROM 6:00 A.M.

AT

"REGAL HALL"

340 WOODLAWN ROAD WEST — GUELPH, ONTARIO

(TURN OVER FOR MAP)

General Admission - - - $2.00

(CHILDREN 12 YEARS & UNDER FREE)

Inside Vendors - $8.00 Per 8 Foot Space

NOTE: **3 Foot x 8 Foot TABLE INCLUDED**

Outside Vendors - $3.00 Per Space

★ REFRESHMENT CONCESSION ★

★ DOOR PRIZES DRAWN THROUGHOUT THE DAY ★

FOR FURTHER INFORMATION CONTACT:

RALPH BARTLETT, VE3BJX - 519-836-2097 - GUELPH

ROCCO FURFARO, VE3HGZ - 519-824-1157 - GUELPH

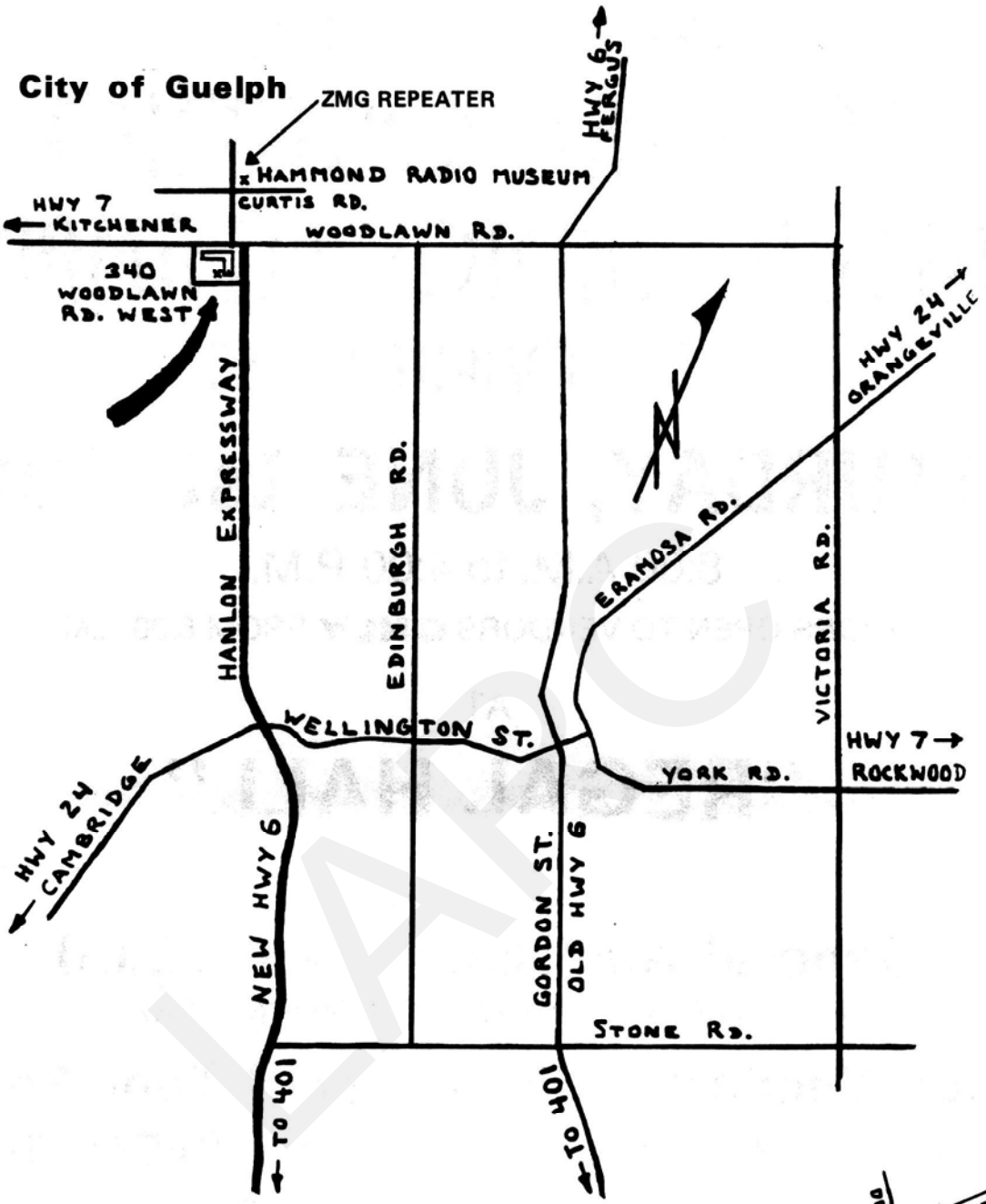
FRED HAMMOND, VE3HC - 519-822-8323 - GUELPH

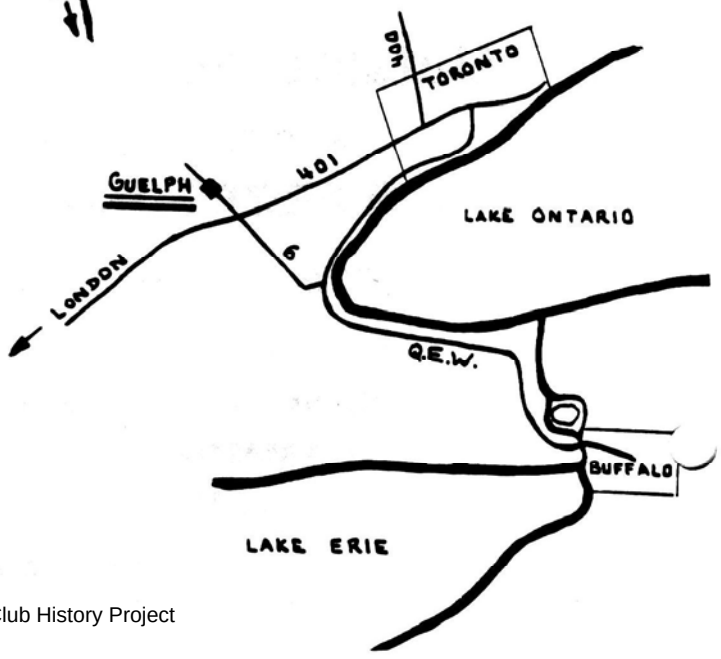
GORD MacPHAIL, VE3IH - 519-822-4367 - GUELPH

or GUELPH AMATEUR RADIO CLUB

P. O. BOX 1305, GUELPH, ONTARIO, N1H 6N9

CENTRAL ONTARIO AMATEUR RADIO FLEAMARKET





TALK IN FREQUENCY
52 - 52 SIMPLEX
147.960 - 147.360
VE3ZMG

SPONSORED BY
THE GUELPH AMATEUR RADIO CLUB

GERALDTON QRM

For the last year activity has been growing in Geraldton. Unfortunately, Bob VE3CMA has passed away leaving the Field Day Coordinator's position to Ken KRX. Regular meetings are being held so Field Day should be a booming success. Word has it the only Red Rock Ham will be joining us for this event. So Field Day should be alot of fun. Another event coming up will be the Canada Day booth. We will of course be having an operating station at the Geraldton Canada Day Fair. Other events discussed are providing communication for walk-a-thons, bike-a-thons, etc.

Congratulation to Ken KRX for obtaining his advanced ticket. Way to go Ken! Also congrats goes to Frank NHZ, Mitch OPN for obtaining their tickets within the last year. Jim Berday??? is happy to announce passing his theory & regs portion of the exam just one more step--Go Jim Go--There are various others working on their tickets and I wish them luck. Our Club is growing.

At present RPT VE3GLD is under construction. It is very likely it will be completed and working by the end of summer. The frequency will be 147.90 in and 147.30 out. At present the hams in Geraldton use simplex 146.52, so if you're ever in the Geraldton area be sure to give us a call.

73 de VE3 JAU

LAKEHEAD AMATEUR RADIO CLUB
P.O. BOX 2571
THUNDER BAY, ONTARIO
P7B 5G1

THUNDER BAY
S V
1985
ON

CANADA

TO:

L. Scalese VE3NHX
237 Dennis Street
THUNDER BAY, Ontario
P7B 5H7

First Class Première classe

HI-Q